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UTILITY PATENT APPLICATION TRANSMITTAL <small>(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))</small>	Attorney Docket No.	RRTHP0102US
	First Inventor or Application Identifier	Rochelle Roth
	Title	MESSAGE DEVICE
	Express Mail Label No.	EK347076291US

APPLICATION ELEMENTS See MPEP chapter 600 concerning utility patent application contents.	ADDRESS TO: Assistant Commissioner for Patents Box Patent Application Washington, DC 20231
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- ☒ * Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
- ☒ Specification [Total Pages **30**]
(preferred arrangement set forth below)
 - Descriptive title of the Invention
 - Cross References to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to Microfiche Appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
- ☒ Drawing(s) (35 U.S.C. 113) [Total Sheets **5**]
- Oath or Declaration [Total Pages **3**]
 - ☒ Newly executed (original or copy)
 - ☐ Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
 - ☐ **DELETION OF INVENTOR(S)**
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

- ☐ Microfiche Computer Program (Appendix)
- Nucleotide and/or Amino Acid Sequence Submission (if applicable, all necessary)
 - ☐ Computer Readable Copy
 - ☐ Paper Copy (identical to computer copy)
 - ☐ Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS	
<input checked="" type="checkbox"/>	Assignment Papers (cover sheet & document(s))
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<input type="checkbox"/>	English Translation Document (if applicable)
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☐ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No: _____ / _____

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For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS					
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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant or Patentee: Rochelle Roth Attorney's Docket No. RRTHP0102US
 Serial or Patent No. Unknown
 Filed or Issued: Herewith
 For: MASSAGE DEVICE

**VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
 (37 CFR 1.9(f) and 1.27(c)) - SMALL BUSINESS CONCERN**

I hereby declare that I am

- ☒ the owner of the small business concern identified below:
☐ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN Midtown Technology
 ADDRESS OF CONCERN 6200 Euclid Avenue, Suite 211, Cleveland, Ohio 44103

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under §41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, the number of employees of the business concern is the average over the previous fiscal year of the concern of the person employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year; and concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the above entitled invention described in

- ☒ the specification filed herewith
☐ application serial no. _____, filed _____
☐ patent no. _____, issued _____

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed in the ☐ Appendix hereto, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Rochelle B. Roth

ADDRESS OF PERSON SIGNING 2751 Chesterton Road, Shaker Hts., Ohio 44122

SIGNATURE Rochelle B. Roth DATE 5/25/00

Docket No: RRTHP0102US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re **PATENT** application of:

Applicant: Roth et al.

Application No: *(not yet assigned)*

For: MESSAGE DEVICE

Filed: Herewith

PRELIMINARY AMENDMENT

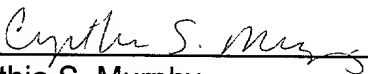
Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir

Please preliminarily amend the above-identified application, prior to calculation of the extra claims fees, by canceling claims 26 - 88.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR



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002030 402360

MESSAGE DEVICE

FIELD OF THE INVENTION

5 This invention relates generally as indicated to a massage device and more particularly to a massage device for use in an unsupervised and unattended setting.

BACKGROUND OF THE INVENTION

10 A massage has long been recognized as a pleasant means of treating stress, muscular aches, fatigue and other symptoms associated with an active life. A professional masseuse is typically employed to provide a massage and this professional is trained to provide pressure sensations by squeezing or kneading muscles or muscle groups in a certain way. Also, a professional masseuse will adapt the massaging technique to the person being massaged.
15 For example, the masseuse will vary the time, intensity (*i.e.*, pressure level), the order of pressure sensations and/or the temperature of massage oil to accommodate a person's massage needs on a particular day. Furthermore, the hands of the masseuse are adaptable to fit almost every size person.

20 A massage applied by a professional masseuse is almost universally considered wonderful. However, the cost of having a professional masseuse constantly on call for periodic massages is outside most people's price range. For most people, a massage by a professional masseuse is only an occasional indulgence although our active lives justify more frequent, and perhaps daily, massages.

25 In the past, massage devices have been developed for medical purposes. For example, U.S. Patent No. 5,014,681 to Neeman discloses an apparatus for applying intermittent compression to a body part "for the purpose of stimulating blood flow in the limb so as to prevent pooling or stasis of blood in a bedridden patient or, alternatively for the purpose of treating edema, *i.e.*, the excessive
30 accumulation of fluid in body fluids."

U.S. Patent No. 4,762,121 to Shienfeld discloses a device for massaging the limbs of a body that is "particularly useful in the treatment of lymphatic

disorders, such as congenital or secondary lymphedema in order to reduce excessive accumulation of fluids in the body tissue." Other possible applications for the Shienfeld device are "in the treatment of venous disorders, such as painful varicose veins, chronic venous insufficiency, an ulcer cruris" and "in the treatment of paralysis of the lower limbs because of long-standing muscular inactivity, and in the prevention of deep vein thrombosis during and after surgical operations."

U.S. Patent Nos. 5,245,990 and 5,383,842 to Bertinin discloses an apparatus "for improving or enhancing venous circulation in persons having venous insufficiencies and for providing muscular massage to prevent muscle atrophy" thereby "to facilitate rehabilitations of injured body parts by promoting venous body flow."

U.S. Patent No. 5,109,832 to Proctor discloses a medical apparatus "to apply compressive forces to a portion of a body for the therapeutic purpose of enhancing venous blood flow to prevent venous thrombosis and pulmonary embolism in surgical patients."

U.S. Patent No. 5,052,377 to Frajdenrajch discloses an apparatus "adapted to be arranged in contact with a part of the body of a patient in order to achieve thereon a succession of local pressures progressing in the direction of lymphatic drainage to be effectuated."

U.S. Patent No. 5,022,387 to Hasty discloses an antiembolism stocking for applying compressive pressures against a patient's limb to counteract pooling or stasis of blood which is particularly pronounced "during surgery, immediately after surgery, and when the patient has been confined to bed for extended periods of time." U.S. Patent No. 4,029,087 to Dye discloses a device designed for similar purposes.

U.S. Patent No. 4,865,020 to Bullard discloses a medical apparatus to improve blood movement to improve capillary circulation and which "may be useful in those conditions in which there is inadequate blood circulation, including Alzheimer's disease (lack of brain blood circulation), kidney malfunctions, and blood capillary circulatory problems, such as loss of hair color and loss of hair growth."

U.S. Patent No. 5,092,317 to Zelikovski discloses a method for use by "on the limbs of sportsmen, athletes, dancers, etc. after having being subject to extreme exertion." The effective purpose of the Zelikovski invention is "to squeeze or milk out from the muscle the generated and accumulated metabolites" and "to accelerate the normal venous return flow so as to accelerate the evacuation/dissipation of the thus squeezed out metabolites."

The massage devices discussed above have many different designs tailored for their particular medical objective. Many of these devices include a garment for enclosing the body part and an inflation assembly. The garment has a plurality of bladders arranged along the garment to massage the body part; and the inflation assembly supplies fluid pressure to each of the bladders to inflate the respective bladders.

The garments/sleeves of these prior art devices probably perform acceptably well for their intended uses. Specifically, for example, since the device is used in a hospital setting, trained medical personnel are available to insure a proper fit of the garments/sleeves on the patient. Additionally or alternatively, in such a medical setting, it may be practical to have an inventory of sleeves/garments of different sizes to accommodate a variety of patient sizes. Further, the appearance of inflation tubing and/or the set-up of such tubing usually does not present any issues in a medical setting. As for the inflation assembly, complicated fluid-providing components and/or distributing components are common place in medical settings.

The inventor appreciated that a massage device intended for use in an unsupervised and unattended setting (such as in-home use) could have many advantages and applications. The inventor further appreciated, however, that many of the features of a massage device which are perfectly acceptable in a supervised medical setting, would not be satisfactory in an unsupervised and unattended setting.

SUMMARY OF THE INVENTION

The present invention provides a massage device for massaging a body part of a person in an unsupervised and unattended setting. The massage

device comprises a garment for enclosing the body part, the garment having a plurality of bladders arranged along the garment to massage the body part, and an inflation assembly which supplies fluid pressure to each of the bladders to inflate the respective bladders.

5 The garment may be made of two opposing sheets with seams between the sheets defining the bladders. The sheets may be made of a material which is lightweight, durable and easily cleanable, such as urethane film. For example, the outer sheet may be urethane film supported on a laminate and the inner sheet may be unsupported urethane film.

10 The inflation assembly may include fluid-providing components, fluid-distributing components, control components, protection components, a display panel, and a power supply. These components of the inflation assembly may be contained within a housing which is sized and shaped to be compatible with unsupervised and unattended use of the massage device. The fluid-providing
15 components could include a compressor, the fluid-distributing components could include a manifold and valves, and the control components could include a micro-controller, a user input interface, and valve drivers. In such a design, the compressor would provide a flow of inflation fluid to the manifold, the drivers would open/close the valves (e.g., activate/deactivate solenoid valves) so that
20 the fluid within the manifold flows through the appropriate valve and to the appropriate bladder in the garment. The drivers could be controlled by the micro-controller based on input through the user input interface.

 According to one embodiment of the invention, the garment has a "one-size-fits-most" design extremely beneficial for use of the massage device in an
25 unsupervised and unattended setting. To this end, the garment may be shaped to accommodate the lower leg portion of the user's body with an opening for receipt of the user's heel. In this case, the garment could have, for example, four bladders which massage the user's foot and eight bladders which massage the user's calf, for a total of twelve bladders. In order to provide a snug fit to the
30 user, the sheets may include a notch on each lateral separating the bottom bladders from the top bladders whereby the garment may provide a snug fit to user. Additionally or alternatively, the garment includes a loop fastening strip and

a complimentary hook fastening strip which, when engaged with each other, form a hook-and-loop attachment. The loop fastening strip could be secured to the inner sheet and the hook fastening strip could be secured to the outer sheet. The loop fastening strips may be secured to the inner sheet laterally inward from pull handles and over and laterally beyond a tubing pocket and the hook fastening strip may be secured to the outer sheet adjacent its longitudinal edge.

In this manner, the garment can be fit to a range of foot widths and leg girths to accommodate users of different sizes and a very broad range of adjustment combinations are possible with the garment instead of simply a large, medium and small adjustment settings. The ability of the garment to provide a snug custom fit to a user results in improved sensation, quicker inflation dynamics, reduced inflation flow requirements (thereby decreasing pump/valve/tubing sizing and minimizing air flow requirements), compacted time lag from a deflated state to a maximum pressure state, and increased time at maximum massage pressure. The snug custom fit of the garment also reduces the inflated size of the bladders thereby maintaining the proper fit of the garment throughout the inflation process.

According to another embodiment of the invention, the bladders have approximately the same inflated volume thereby equalizing the inflation volume of the respective bladders. In this manner, substantially even inflation timing, with substantially even applied pressure, and, thus, overall smooth massage dynamics may be provided without overly complicated inflation fluid control. Approximately uniform inflated volumes are accomplished by necking seams in at least some of the bladders and the decreased volume in the necked bladder(s) is accomplished without decreasing the sensation of the necked bladder(s). For example, the necked shape of each of the bladders does not substantially change the original, overall, shape of the unnecked bladder (e.g., rectangular) so that substantially the same massage sensation is delivered. If the garment is shaped to accommodate the lower leg portion of the user's body, the top bladders circumscribing the user's calf could be necked and the bottom bladders circumscribing the user's foot could be unnecked.

According to another embodiment of the invention, the garment may include a pocket having an opening communicating with the respective bladders and wherein the inflation assembly including a source of inflation fluid and tubing extending from this source into the pocket. The enclosure of the tubing in the pocket provides a "clean appearance" compatible with in-home use of the massage device. Also, the enclosure and the pre-purchase setup of the tubing eliminates any what-tube-where confusion during in-home use of the massage device.

According to another embodiment of the invention, the inflation fluid may flow through throttled exhaust lines during deflation of the bladders. The throttling rate may be the same or may vary between respective bladders. Additionally or alternatively, the inflation assembly may include a zone selector which allows a user to select a certain zone of the garment thereby allowing concentration on a particular zone of the user's body. The zones may be preset of may be user-defined. If the garment is shaped to accommodate the lower leg portion of the user's body, for example, the bottom bladders that massage the user's foot could be grouped as a first foot zone and the top bladders that massage the user's calf could be grouped in a second lower calf zone and a third upper calf zone.

These and other features of the invention are fully described and particularly pointed out in the claims. The following descriptive annexed drawings set forth in detail certain illustrative embodiments of the invention, these embodiments being indicative of but a few of the various ways in which the principles of the invention may be employed.

DRAWINGS

Figure 1 is a prospective view of a massage device according to the present invention being used in an unsupervised and unattended setting, the massage device including a garment and an inflation assembly.

Figure 2A is a prospective view of the garment in a wrapped condition, the garment including an outer sheet and an inner sheet.

Figure 2B is a plan view of the garment in an unwrapped condition with its outer sheet face up.

Figure 2C is a plan view of the garment in an unwrapped condition with its inner sheet face up.

5 Figure 3A is a schematic view of the garment and inflation assembly of the massage device.

Figure 3B is a schematic view of the components of the inflation assembly.

10 Figure 3C is a top view of the inflation assembly with the top wall of its housing removed to show interior components.

Figure 3D is a front view of the inflation assembly with its front display panel removed to show interior components.

Figure 3E is an enlarged front view of the front display panel of the inflation assembly.

15 Figure 4A is a graph showing the sequential inflation of garment bladders according to one inflation pattern.

Figure 4B is a graph showing the sequential inflation of garment bladders according to another inflation pattern.

20 Figure 4C is a graph showing the sequential inflation of garment bladders according to another inflation pattern.

DETAILED DESCRIPTION

Referring now to the drawings, and initially to Figure 1, a massage device 100 according to the present invention is shown in use in an unsupervised and unattended setting. The massage device includes a garment 200 for enclosing a body part and an inflation assembly 300 which supplies fluid pressure to the garment 200.

Referring to Figures 2A - 2C, the garment 200 is shown isolated from the other components of the massage device 100. The garment 200 comprises two opposing sheets 202 and 204 made of a suitable material, such as a material which is lightweight, durable, and easily cleanable with water and a mild cleanser. For example, the outer sheet 202 may be made of urethane film

supported with a laminate of 70 x 100 denier nylon weave and the inner sheet 204 may be made of unsupported urethane film.

Each of the sheets 202/204 has lateral edges 206 and 208 and longitudinal edges 210 and 212. The lateral edges, or top and bottom edges, 206 and 208 follow a generally straight or slightly curved path. The longitudinal edge 210 follows a generally linear path except for a V-shaped notch 213 and two U-shaped notches 214 and 215. The longitudinal edge 212 follows a contoured path to form an extension including a tubing pocket 220 and pull handles 222 and has a corresponding V-shaped notch 216. The sheets 202 and 204 each have a roughly rectangular shape with an aligned opening to form a heel opening 224 in the garment 200.

The sheets 202 and 204 are welded together along lateral seams 230, 232 and 234 and longitudinal seams 236, 238 and 240. One of the lateral seams 230 is positioned along the sheets' top lateral edge 206 and another of the lateral seams 232 is positioned along the sheets' bottom lateral edge 208. The remaining lateral seams 234 (twelve in the illustrated embodiment) are positioned in an approximately parallel series throughout the length of the sheets 202/204. Longitudinal seam 236 is positioned laterally inward from the sheets' longitudinal edge 212, longitudinal seam 238 is positioned laterally inward from the seam 236, and longitudinal seam 240 is positioned along the sheets' longitudinal edge 210. Necking seams 242 are also provided for inflation-control reasons explained below. Although not specifically shown in the drawings, reinforcement seams may be provided around the opening-defining edges of the pull handles 222, around the defining edges of the heel opening 224, around the defining edges of V-shaped notches 213 and 216, and/or around the defining edges of U-shaped notches 214 and 215.

The lateral seams 230, 232 and 234 and the longitudinal seams 238 and 240 form a plurality of inflatable bladders 250. In the illustrated embodiment, the garment 200 includes twelve inflatable bladders 250A - 250L which are roughly rectangular in shape and arranged longitudinally along the length of the garment 200. The position of the bladders 250A - 250C corresponds to the foot location,

the position of the bladder 250D corresponds to the heel location, and the position of the bladders 250E - 250L corresponds to the lower leg location.

As indicated above, the bladders 250 are each roughly rectangular in shape. The bladders 250 are more particularly shaped so that they each have an approximately equal inflated volume. This may be accomplished by varying the spacing of the seams 234 and/or by the necking seams 242 which decrease the inflation volume of certain bladders. In the illustrated embodiment, the top eight bladders 250E - 250L are provided with necking seams 242. By equalizing the inflation volume of the respective bladders 250, substantially even inflation timing, with substantially even applied pressure, and, thus, overall smooth massage dynamics are provided without the need for overly complicated inflation fluid control.

Significantly, the decreased volume in the necked bladders 250E - 250L is accomplished without decreasing the sensation of a particular bladder. For example, the necked shape of each of the bladders does not substantially change the original, overall, shape of the unnecked bladder so that substantially the same massage sensation is delivered. In the illustrated embodiment, the necked bladders 250E-250L still maintain a generally rectangular inflation chamber so that substantially the same massage sensation is delivered.

The longitudinal seams 236 and 238 form the longitudinal sides of the manifold pocket 220 and the lateral seams 230 and 232 close the pocket's top and bottom sides. A series of openings 260 in the pocket 220 communicate with the respective bladders 250. The V-shaped slit 216 interrupts the pocket 220 at a location aligned with the seam 234 separating the bladders 250D and 250E.

As was indicated above, the pocket 220 houses certain components of the inflation assembly 300, namely tubing 310, introduced below. The openings 260 allow the tubing to communicate with the bladders 250 and the slots 262 and 264 provides an entry passage for the tubing 310 into the top and bottom portions of the pocket 220. Although not specifically shown in the drawings, the tubing may be connected to the bladders via an inflation "port", such as a push-on barb for the tubing attachment.

The garment 200 additionally includes a fastening strip 270 and a complimentary fastening strip 272 which, when engaged with each other, form a hook-and-loop attachment. The "loop" fastening strip 270 is secured to the inner sheet 204 laterally inward from the pull handles 222 and over and laterally beyond the manifold pocket 220. The "hook" fastening strip 272 is secured to the outer sheet 202 adjacent its longitudinal edge 210.

When the using the massage device 100, the garment 200 is wrapped around the person's leg. Specifically, the person places his/her heel in the opening 224 and wraps the opposite lateral sections of the sheets 202/204 in the direction shown by the arrows in Figure 2A. The pull handles 222 are then used to pull the strips 270 and 272 into the correct engaging contact with each other for a snug fit. To remove the garment 200 after a massage session is completed, the pull handles 222 are pulled outward to release the hook-and-loop attachment of the fastening strips 270 and 272.

The overall sheet geometry, the positioning of the fastening strips 270 and 272, the lateral extent of the fastening strips and/or other features of the garment 200 allow for a custom fit of the garment 200 to the user. Specifically, for example, the garment 200 can be fit to a range of foot widths and leg girths to accommodate users of different sizes. A very broad range of adjustment combinations are possible with the garment 200 instead of simply a large, medium and small adjustment settings. Thus, the garment 200 has a "one-size-fits-most" design extremely beneficial for use of the massage device 100 in an unsupervised and unattended setting. The ability of the garment 200 to provide a snug custom fit to a user results in improved sensation, quicker inflation dynamics, reduced inflation flow requirements (thereby decreasing pump/valve/tubing sizing and minimizing air flow requirements), compacted time lag from a deflated state to a maximum pressure state, and increased time at maximum massage pressure.

The snug custom fit of the garment 200 reduces the inflated size of the bladders 250 thereby maintaining the proper fit of the garment throughout the inflation process. By virtue of this snug fit, the bladders 250 do not "balloon" away from limb in a third dimension during inflation. In this manner, there is little

or no longitudinal "shrinking" of the garment (which would occur if the garment material had to move outward from the limb during inflation) hence maintaining a proper fit during the entire massage.

The garment 200 may include other or further features to facilitate comfort and/or massage characteristics. For example, padding may be provided on the inner surface of the manifold pocket 220 as a cushion between the inflation components housed in the pocket and the user's leg and foot. Additionally, non-slip grid elements may be placed on the outer sheet 202 on the portion of the garment 200 which is positioned beneath the user's foot. Further, various sized holes may be punched through both inner and outer sheet 202/204, between any adjacent seams 234 or 242 to allow for ventilation. Still further, a moisture-wicking lining material may be applied to the surface of the inner sheet 204 for comfort.

It should be noted at this point that although the illustrated garment 200 is designed for use on a person's foot and leg, alternate garments are possible with, and contemplated by, the present invention. For example, the garment 200 may be designed in a similar manner to provide a snug custom-fit for other body parts, such as an arm (upper and/or lower with or without hand), hand only, thigh, foot only, neck and shoulders, and/or back. Additionally, garments may be used in alike combinations, for example both hands together, or in different combinations, for example, leg and thigh together.

Referring now additionally to Figure 3A, the inflation assembly 300 is shown connected to the garment 200. The components of the inflation assembly 300 are contained within a housing 302 which is sized and shaped to be compatible with in-home use of the massage device 100. In the illustrated embodiment, the housing 302 is rectangular in shape, is approximately ten inches wide, nine inches deep, and four inches high, and a handle 304 is provided to selectively prop the housing 302 at a desired angle on, for example, an end table positioned adjacent to a chair.

Connection tubes 310 extend from the inflation assembly 300 to the garment 200 and, more particularly, to the bladder openings 260a - 260l. As is best seen by referring additionally to Figures 2B and 3B, the tubes 310a - 310d

extend into the lower portion of the pocket 220 and the tubes 310e - 310l extend into the upper portion of the pocket 220. The enclosure of the connection tubes 310 in such a pocket 220, provides a "clean appearance" compatible with in-home use of the massage device 100. Also, the enclosure and the pre-purchase setup of the tubing 310 eliminates any what-tube-where confusion during in-home use of the massage device 100.

As is shown schematically in Figure 3B and/or in Figures 3C and 3D, the inflation assembly 300 incorporates the fluid-providing components (a compressor 320, and an air filter 322 when air is used as the pressurizing medium), fluid-distributing components (a manifold 324, valves 326a - 326l) control components (micro-controller 328, user input interface 330, valve drivers 332), protection components (pressure relief valve 334, audio and/or visual alert 336), a display panel 338, and a power supply 340 for providing power to relevant components.

During operation of the massage device 100, the compressor 320 provides a flow of inflation fluid (air filtered through the filter 322) to the manifold 324. The valve drivers 332 open/close the valves 326 so that the fluid within the manifold flows through the appropriate valve and to the appropriate bladder 250 in the garment 200. In the illustrated embodiment, the valves 326 are solenoid valves whereby the drivers 332 are solenoid drivers which activate/deactivate the solenoids.

The compressor 320 of the inflation assembly 300 may be one which provides a substantially constant inflation capacity to each of the bladders. As was explained above, a substantially constant velocity and magnitude pressure wave along the garment 200 is accomplished by varying the geometry of the bladders 250. By providing uniform inflation characteristics of the bladders 250 with a substantially constant inflation capacity, a more uniform, repeatable, predictable, and satisfying massage action can be obtained. Further, more economical, more compact, and/or more reliable inflation components, such as compressors and valves, may be used.

During inflation of the garment bladders 250, inflation fluid flows through the tubing 310 to the appropriate bladder 250. During deflation of the garment

bladders 250, the inflation fluid flows through the tubing in the reverse direction and through exhaust lines 350. In the illustrated embodiment, the exhaust lines 350 include a throttling device (such as the illustrated orifice restriction) to provide a repeatable and gradual deflation rate for the bladders. If necessary for
5 uniformity, the throttling rate (or orifice size in the illustrated embodiment) may vary between respective bladders.

The solenoid drivers 332 are controlled by the microcontroller 328 based on input through the user input interface 330. The microcontroller 328 may be programmed to inflate the garment bladders 250 in such a manner that there is
10 smooth transition from one bladder to the next during the massage process. For example, the deflation of the first bladder 250A may be throttled so that the inflation of the next bladder 250B is underway prior to complete deflation of the first bladder. (Figure 4A.) The same effect may be accomplished without a throttled deflation, but the inflation of the next bladder must begin earlier in the
15 timing sequence. (Figure 4B.) Alternatively, the inflation of the next bladder may be delayed until the previous bladder is completely deflated. (Figure 4C.)

As shown in Figure 3E, the user input interface 330 and the user display 338 are incorporated into a display panel 360. The display panel 360 includes a zone selector 362 which, via the user input interface 330, allows a user to select
20 a certain zone of the garment 200. This zone selection allows concentration on a particular zone of the user's body, such as the foot, the lower calf, or the upper calf. In the illustrated embodiment, for example, the garment bladders 250A - 250D are grouped in a first "foot" massage zone, the garment bladders 250E- 250H are grouped in a second "lower calf" massage zone, and the garment
25 bladders 250I - 250L are grouped in a third "upper calf" massage zone. Thus, illustrated display panel 360 allows the user to select the desired preset massage zone. However, an inflation assembly 300 wherein user-definable zones may be input (such as a middle calf zone) are possible with, and contemplated by, the present invention.

30 The display panel 360 additionally includes an intensity selector 364, a time selector 366, and a power switch 368. The intensity selector 364 allows a user to input a setting in the range of the interrelation between speed and

pressure and this input is provided, via the interface 330, to the micro-controller 328 to appropriately control the solenoid drivers 332. With a substantially constant capacity inflation assembly 300, there is an inverse relationship between pressure within the massage pressure wave. Specifically, the faster the massage pressure wave travels the lower the applied pressure within the massage pressure wave and vice versa. The pressure relief valve 334 limits the maximum pressure that can be developed and therefore delivered to the garment 200. To this end, the valve 334 should be inaccessible to the user and tamper proof.

The time selector 366 allows a user to choose a time period for the massage session and this input is provided, the interface 330, to the micro-controller 328. This selector 366 includes an uppermost setting (thirty minutes in the illustrated embodiment) to prevent over use of the massage device 100. Upon completion of the massage session, the audio and/or visual alert 336 alerts the user of the end of the massage session. The power switch 368 activates or deactivates the power supply 340.

The display panel 360 or other suitable component of the massage device 100 may include a "hold" input 380 which, upon activation by the user, provides continuous pressure (or continuous pulsating pressure) in a selected garment chamber or chambers thereby providing concentrated action on a particularly tense portion of the body.

One may further appreciate that although the invention has been shown and described with respect to a certain preferred embodiment, obvious and/or equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of this specification. The present invention includes all equivalent alterations and modifications and is limited only by the scope of the following claims.

CLAIMS

1. A massage device for massaging a body part of a person in an unsupervised and unattended setting, said massage device comprising:

5 a garment for enclosing the body part, the garment having a plurality of bladders arranged along the garment to massage the body part; and

an inflation assembly which supplies fluid pressure to each of the bladders to inflate the respective bladders;

10 wherein each of the bladders has approximately the same inflated volume thereby equalizing the inflation volume of the respective bladders whereby substantially even inflation timing, with substantially even applied pressure, and, thus, overall smooth massage dynamics may be provided without overly complicated inflation fluid control.

15 2. A massage device for massaging a body part of a person in an unsupervised and unattended setting, said massage device comprising:

a garment for enclosing the body part, the garment having a plurality of bladders arranged along the garment to massage the body part; and

20 an inflation assembly which supplies fluid pressure to each of the bladders to inflate the respective bladders;

25 wherein the garment is shaped to accommodate the lower leg portion of the user's body, wherein bottom bladders massage the user's foot and top bladders massage the user's calf, and wherein the sheets include a notch on each lateral side separating the bottom bladders from the top bladders whereby the garment may provide a snug fit to user.

3. A massage device for massaging a body part of a person in an unsupervised and unattended setting, said massage device comprising:

30 a garment for enclosing the body part, the garment having a plurality of bladders arranged along the garment to massage the body part; and

an inflation assembly which supplies fluid pressure to each of the bladders to inflate the respective bladders;

wherein the garment includes a pocket having an opening communicating with the respective bladders and wherein the inflation assembly including a source of inflation fluid and tubing extending from this source into the pocket.

5 4. A massage device for massaging a body part of a person in an unsupervised and unattended setting, said massage device comprising:

 a garment for enclosing the body part, the garment having a plurality of bladders arranged along the garment to massage the body part; and

 an inflation assembly which supplies fluid pressure to each of the bladders
10 to inflate the respective bladders;

 wherein the garment includes a loop fastening strip and a complimentary hook fastening strip which, when engaged with each other, form a hook-and-loop attachment;

 wherein the loop fastening strip is secured to the inner sheet and the hook
15 fastening strip is secured to the outer sheet;

 wherein the loop fastening strips is secured to the inner sheet laterally inward from pull handles and over and laterally beyond a tubing pocket and wherein the hook fastening strip is secured to the outer sheet adjacent its longitudinal edge.
20

 5. A massage device for massaging a body part of a person in an unsupervised and unattended setting, said massage device comprising:

 a garment for enclosing the body part, the garment having a plurality of bladders arranged along the garment to massage the body part; and

 an inflation assembly which supplies a substantially constant inflation
25 capacity to each of the bladders.

 6. A massage device for massaging a body part of a person in an unsupervised and unattended setting, said massage device comprising:

 a garment for enclosing the body part, the garment having a plurality of
30 bladders arranged along the garment to massage the body part; and

 an inflation assembly which selectively inflates and deflates the bladders;

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11. A massage device as set forth in claim 10, wherein decreased volume in the necked bladder(s) is accomplished without decreasing the sensation of the necked bladder(s).

12. A massage device as set forth in claim 10, wherein the necked shape of each of the bladders does not substantially change the original, overall, shape of the unnecked bladder so that substantially the same massage sensation is delivered.

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13. A massage device as set forth in claim 12, wherein the necked shape and unnecked shape of the bladders is substantially rectangular.

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14. A massage device as set forth in claim 12, wherein the garment is shaped to accommodate the lower leg portion of the user's body, and wherein top bladders circumscribing the user's calf are necked and the bottom bladders circumscribing the user's foot are unnecked.

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15. A massage device as set forth in claim 14, wherein the garment includes twelve bladders, wherein four of these bladders massage the user's foot and eight of these bladders massage the user's calf.

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16. A massage device as set forth in claim 9, wherein the garment comprises two opposing sheets made of a material which is lightweight, durable and easily cleanable.

25

17. A massage device as set forth in claim 16, wherein the sheets are made of urethane film.

18. A massage device as set forth in claim 17, wherein the outer sheet is urethane film supported on a laminate and wherein the inner sheet is unsupported urethane film.

30

19. A massage device as set forth in claim 1, wherein the garment is shaped to accommodate the lower leg portion of a user, wherein the garment comprises sheets with seams therebetween to define the bladders and wherein the sheets have an opening for receipt of the user's heel.

20. A massage device as set forth in claim 1, wherein the garment is shaped to accommodate the lower leg portion of the user's body, wherein bottom bladders massage the user's foot and top bladders massage the user's calf, and wherein the sheets include a notch on each lateral side separating the bottom bladders from the top bladders.

21. A massage device as set forth in claim 1, wherein the garment includes a pocket having opening communicating with the respective bladders and wherein the inflation assembly including a source of inflation fluid and tubing extending from this source into the pocket.

22. A massage device as set forth in claim 21, wherein the garment is shaped to accommodate the lower leg portion of the user's body, wherein bottom bladders massage the user's foot and top bladders massage the user's calf, wherein the sheets include a notch on each lateral side separating the bottom bladders from the top bladders, and wherein the pocket includes slots adjacent the notch to provide an entry passage for the tubing into the top and bottom portions of the pocket.

23. A massage device as set forth in claim 1, wherein the garment includes a loop fastening strip and a complimentary hook fastening strip which, when engaged with each other, form a hook-and-loop attachment.

24. A massage device as set forth in claim 23, wherein the loop fastening strip is secured to the inner sheet and the hook fastening strip is secured to the outer sheet.

25. A massage device as set forth in claim 24, wherein the loop fastening strips is secured to the inner sheet laterally inward from pull handles and over and laterally beyond a tubing pocket and wherein the hook fastening strip is secured to the outer sheet adjacent its longitudinal edge.

26. A massage device as set forth in claim 2, wherein the garment comprises sheets with seams therebetween to define the bladders and wherein the sheets have an opening for receipt of the user's heel.

5 27. A massage device as set forth in claim 26, wherein the garment includes a pocket having an opening communicating with the respective bladders and wherein the inflation assembly including a source of inflation fluid and tubing extending from this source into the pocket.

10 28. A massage device as set forth in claim 27, wherein the sheets include a notch on each lateral side separating the bottom bladders from the top bladders, and wherein the pocket includes slots adjacent the notch to provide an entry passage for the tubing into the top and bottom portions of the pocket.

15 29. A massage device as set forth in claim 28, wherein the garment includes a loop fastening strip and a complimentary hook fastening strip which, when engaged with each other, form a hook-and-loop attachment.

20 30. A massage device as set forth in claim 29, wherein the loop fastening strips is secured to the inner sheet laterally inward from pull handles and over and laterally beyond a tubing pocket and wherein the hook fastening strip is secured to the outer sheet adjacent its longitudinal edge.

25 31. A massage device as set forth in claim 30, wherein the loop fastening strips is secured to the inner sheet laterally inward from pull handles and over and laterally beyond the tubing pocket and wherein the hook fastening strip is secured to the outer sheet adjacent its longitudinal edge.

30 32. A massage device as set forth in claim 3, wherein the garment is shaped to accommodate the lower leg portion of the user's body, wherein bottom bladders massage the user's foot and top bladders massage the user's calf, wherein the sheets include a notch on each lateral side separating the bottom

bladders from the top bladders, and wherein the pocket includes slots adjacent the notch to provide an entry passage for the tubing into the top and bottom portions of the pocket.

5 33. A massage device as set forth in claim 32, wherein the garment includes a loop fastening strip and a complimentary hook fastening strip which, when engaged with each other, form a hook-and-loop attachment.

10 34. A massage device as set forth in claim 33, wherein the loop fastening strip is secured to the inner sheet and the hook fastening strip is secured to the outer sheet.

15 35. A massage device as set forth in claim 34, wherein the loop fastening strips is secured to the inner sheet laterally inward from pull handles and over and laterally beyond a tubing pocket and wherein the hook fastening strip is secured to the outer sheet adjacent its longitudinal edge.

20 36. A massage device as set forth in claim 5, wherein each of the bladders has approximately the same inflated volume thereby equalizing the inflation volume of the respective bladders whereby substantially even inflation timing, with substantially even applied pressure, and, thus, overall smooth massage dynamics may be provided without overly complicated inflation fluid control.

25 37. A massage device as set forth in claim 36, wherein necking seams are positioned relative to at least some of the bladders to provide each of the bladders with approximately the same inflated volume.

30 38. A massage device as set forth in claim 37, wherein decreased volume in the necked bladder(s) is accomplished without decreasing the sensation of the necked bladder(s).

39. A massage device as set forth in claim 38, wherein the necked shape of each of the bladders does not substantially change the original, overall, shape of the unnecked bladder so that substantially the same massage sensation is delivered.

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40. A massage device as set forth in claim 39, wherein the necked shape and unnecked shape of the bladders is substantially rectangular.

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41. A massage device as set forth in claim 40, wherein the garment is shaped to accommodate the lower leg portion of the user's body, and wherein top bladders circumscribing the user's calf are necked and the bottom bladders circumscribing the user's foot are unnecked.

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42. A massage device as set forth in claim 41, wherein the garment includes twelve bladders, wherein four of these bladders massage the user's foot and eight of these bladders massage the user's calf.

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43. A massage device as set forth in claim 5, wherein the inflation assembly includes fluid-providing components, fluid-distributing components, control components, protection components, a display panel, and a power supply.

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44. A massage device as set forth in claim 43, wherein the components of the inflation assembly are contained within a housing which is sized and shaped to be compatible with in-home use of the massage device.

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45. A massage device as set forth in claim 44, wherein the fluid-providing components include a compressor, the fluid-distributing components includes a manifold and valves, and the control components comprise a micro-controller, a user input interface, and valve drivers, and wherein the compressor provides a flow of inflation fluid to the manifold, the valve drivers open/close the

valves so that the fluid within the manifold flows through the appropriate valve and to the appropriate bladder in the garment.

46. A massage device as set forth in claim 45, wherein the valves are solenoid valves and wherein the valve drivers activate/deactivate the solenoids to open/close the valves.

47. A massage device as set forth in claim 46, wherein the protection components comprise an inaccessible and tamper proof pressure relief valve that limits the maximum pressure that can be developed and therefore delivered to the garment.

48. A massage device as set forth in claim 47, wherein the protection components comprise an audio and/or visual alert which alerts the user of the end of the massage session.

49. A massage device as set forth in claim 48, wherein, during deflation of the bladders, the inflation fluid flows through exhaust lines and wherein at least some of the exhaust lines include a throttling device.

50. A massage device as set forth in claim 49, wherein the throttling rate varies between respective bladders.

51. A massage device as set forth in claim 49, wherein tubing extends from the respective solenoid valve to the corresponding bladder and wherein the exhaust lines extend from the solenoid valve.

52. A massage device as set forth in claim 51, wherein the garment includes a pocket having an opening communicating with the respective bladders and wherein tubing extends into the pocket.

53. A massage device as set forth in claim 52, wherein the garment is shaped to accommodate the lower leg portion of the user's body, wherein bottom

bladders massage the user's foot and top bladders massage the user's calf, wherein the sheets include a notch on each lateral side separating the bottom bladders from the top bladders, and wherein the pocket includes slots adjacent the notch to provide an entry passage for the tubing into the top and bottom portions of the pocket.

54. The massage device as set forth in claim 45, wherein the drivers are controlled by the micro-controller based on input through the user input interface and wherein the micro-controller is programmed to inflate the garment bladders in such a manner that there is smooth transition from one bladder to the next during the massage process.

55. The massage device as set forth in claim 54, wherein inflation of a bladder is underway prior to complete deflation of the previously inflated bladder.

56. The massage device as set forth in claim 55, wherein the deflation of the bladders is throttled.

57. The massage device as set forth in claim 54, wherein inflation of a bladder is delayed until complete deflation of the previously inflated bladder.

58. The massage device as set forth in claim 45, wherein the user display and the user input are incorporated into a display panel.

59. The massage device as set forth in claim 58, wherein the display panel includes a zone selector which, via the user input interface, allows a user to select a certain zone of the garment.

60. A massage device as set forth in claim 59, wherein the zones are preset.

61. A massage device as set forth in claim 59, wherein the garment is shaped to accommodate the lower leg portion of the user's body, wherein bottom bladders massage the user's foot and top bladders massage the user's calf, and wherein the bottom bladders are grouped as a first foot zone.

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62. A massage device as set forth in claim 61, wherein the top bladders are grouped in a second lower calf zone and a third upper calf zone.

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63. A massage device as set forth in claim 58, wherein the display panel includes an intensity selector which allows a user to input a setting in the range of the interrelation between speed and pressure and this input is provided, via the interface, to the micro-controller to appropriately control the drivers.

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64. A massage device as set forth in claim 58, wherein the display panel additionally includes a time selector for choosing a time period for a massage session and this input is provided, via the interface, to the micro-controller.

20

65. A massage device as set forth in claim 6, wherein the throttling rate varies between respective bladders.

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66. A massage device as set forth in claim 65, wherein the inflation assembly includes fluid-providing components, fluid-distributing components, control components, protection components, a display panel, and a power supply.

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67. A massage device as set forth in claim 66, wherein the components of the inflation assembly are contained within a housing which is sized and shaped to be compatible with in-home use of the massage device.

68. A massage device as set forth in claim 67, wherein the fluid-providing components include a compressor, the fluid-distributing components

includes a manifold and valves, and the control components comprise a micro-controller, a user input interface, and valve drivers, and wherein the compressor provides a flow of inflation fluid to the manifold, the drivers open/close the valves so that the fluid within the manifold flows through the appropriate valve and to the appropriate bladder in the garment.

69. A massage device as set forth in claim 68, wherein the valves are solenoid valves and wherein the valve drivers activate/deactivate the solenoids to open/close the valves.

70. A massage device as set forth in claim 69, wherein tubing extends from the respective valve to the corresponding bladder and wherein the exhaust lines extend from the valve.

71. The massage device as set forth in claim 7, wherein the deflation of the bladders is throttled.

72. A massage device as set forth in claim 7, wherein the inflation assembly includes fluid-providing components, fluid-distributing components, control components, protection components, a display panel, and a power supply.

73. A massage device as set forth in claim 72, wherein the components of the inflation assembly are contained within a housing which is sized and shaped to be compatible with in-home use of the massage device.

74. A massage device as set forth in claim 73, wherein the fluid-providing components include a compressor, the fluid-distributing components includes a manifold and valves, and the control components comprise a microcontroller, a user input interface, and valve drivers, and wherein the compressor provides a flow of inflation fluid to the manifold, the drivers

open/close the valves so that the fluid within the manifold flows through the appropriate valve and to the appropriate bladder in the garment.

5 75. A massage device as set forth in claim 74, wherein the valves are solenoid valves and wherein the valve drivers activate/deactivate the solenoids to open/close the valves.

10 76. The massage device as set forth in claim 75, wherein the drivers are controlled by the micro-controller based on input through the user input interface and wherein the micro-controller is programmed to inflate the garment bladders in such a manner that the inflation of a bladder is underway prior to complete deflation of the previously inflated bladder.

15 77. A massage device as set forth in claim 8, wherein the zones are preset.

20 78. A massage device as set forth in claim 8, wherein the garment is shaped to accommodate the lower leg portion of the user's body, wherein bottom bladders massage the user's foot and top bladders massage the user's calf, and wherein the bottom bladders are grouped as a first foot zone.

 79. A massage device as set forth in claim 78, wherein the top bladders are grouped in a second lower calf zone and a third upper calf zone.

25 80. A massage device as set forth in claim 8, wherein the inflation assembly includes fluid-providing components, fluid-distributing components, control components, protection components, a display panel, and wherein these components are contained within a housing which is sized and shaped to be compatible with in-home use of the massage device.

30 81. A massage device as set forth in claim 80, wherein the fluid-providing components include a compressor, the fluid-distributing components

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* * *

ABSTRACT

A massage device for massaging a body part of a person in an unsupervised and unattended setting. The massage device includes a garment, shaped to provide a snug fit and having a plurality of bladders arranged along the garment to massage the body part. An inflation assembly supplies fluid pressure to each of the bladders to inflate the respective bladders. The bladders may have approximately the same inflated volume thereby equalizing the inflation volume of the respective bladders whereby substantially even inflation timing, with substantially even applied pressure, and, thus, overall smooth massage dynamics may be provided without overly complicated inflation fluid control (e.g., an inflation assembly which supplies a substantially constant inflation capacity to each of the bladders). The garment may include a pocket having an opening communicating with the respective bladders and tubing from the inflation assembly extends into this pocket. The inflation assembly may provide throttled deflation flow, tapered inflation/deflation patterns, and/or a zone selector which allows a user to select a certain zone of the garment.

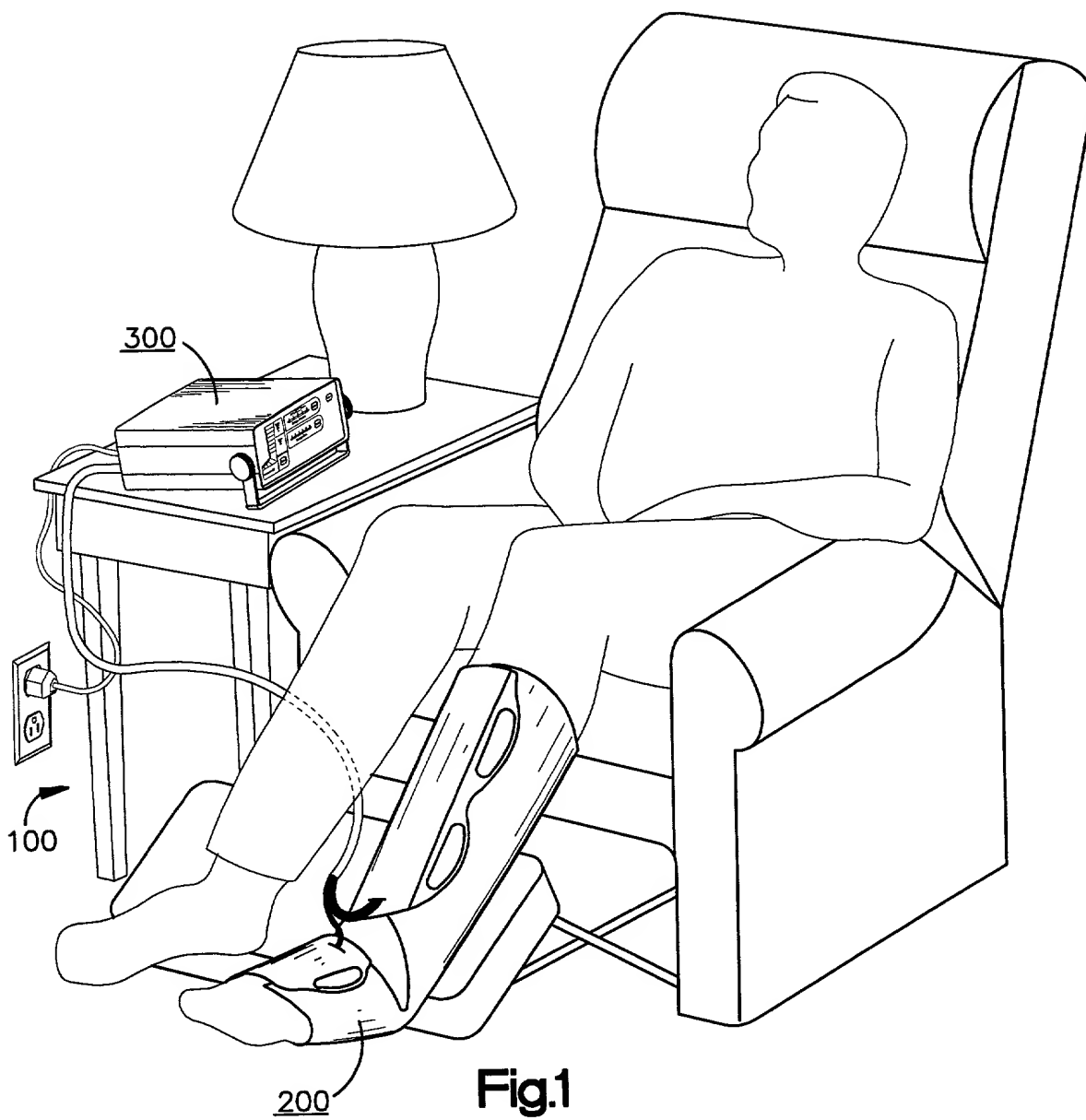


Fig.1

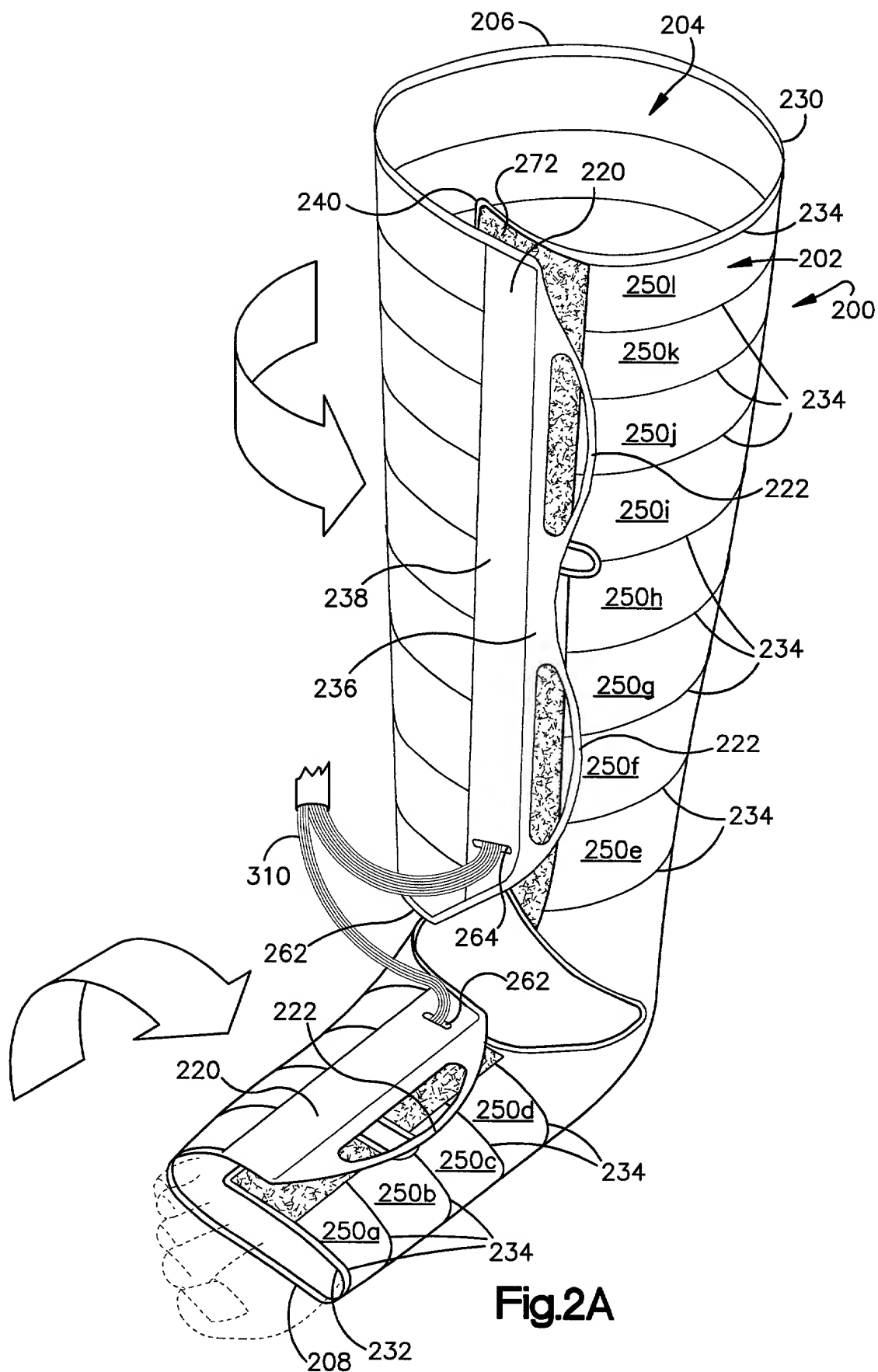


Fig.2A

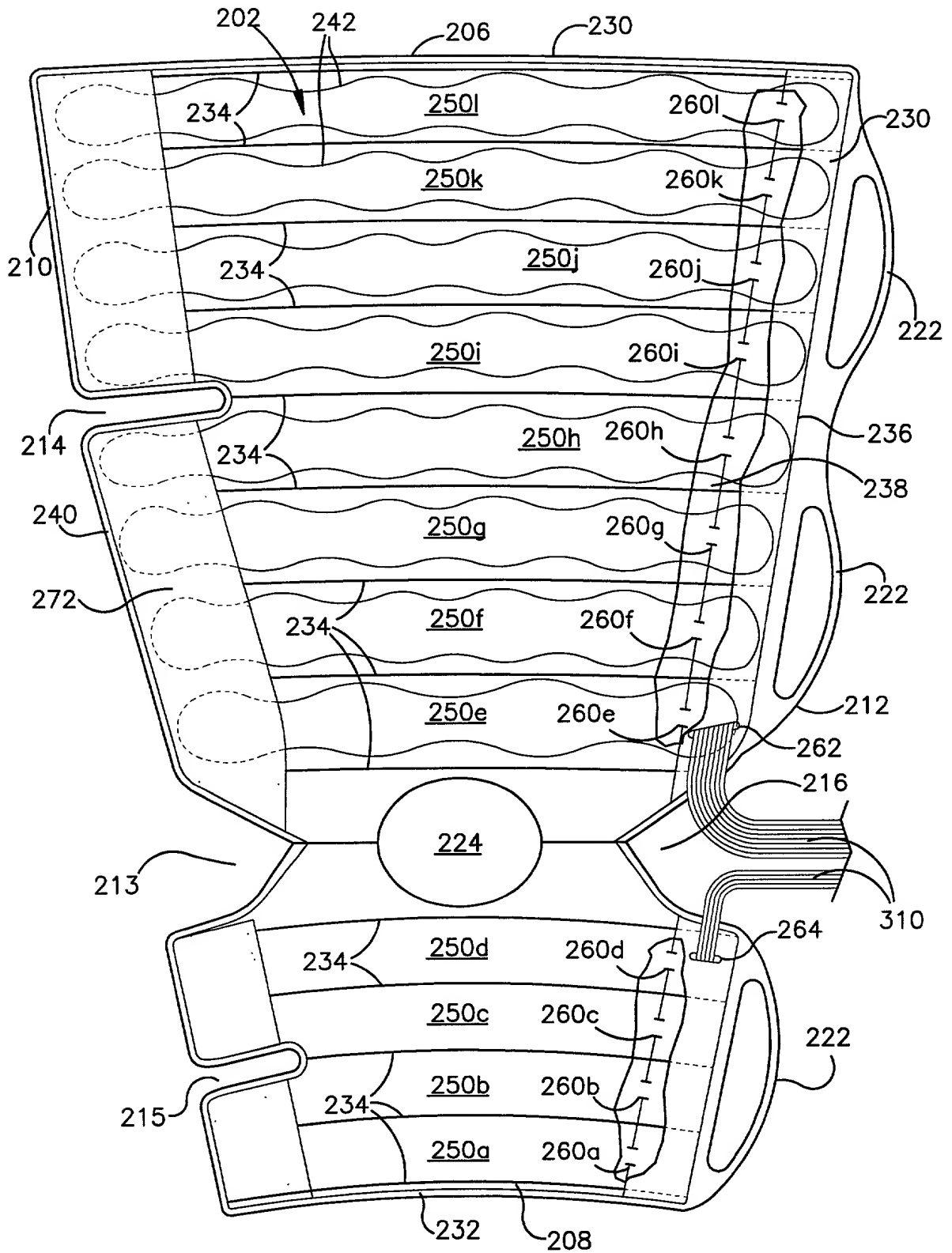
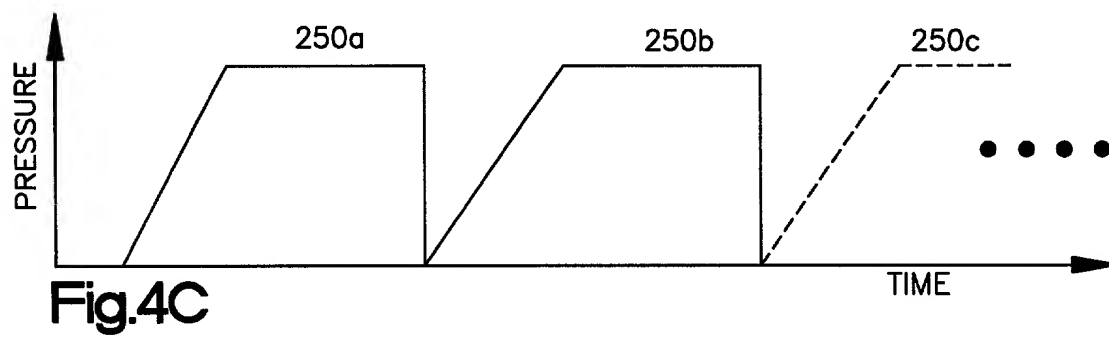
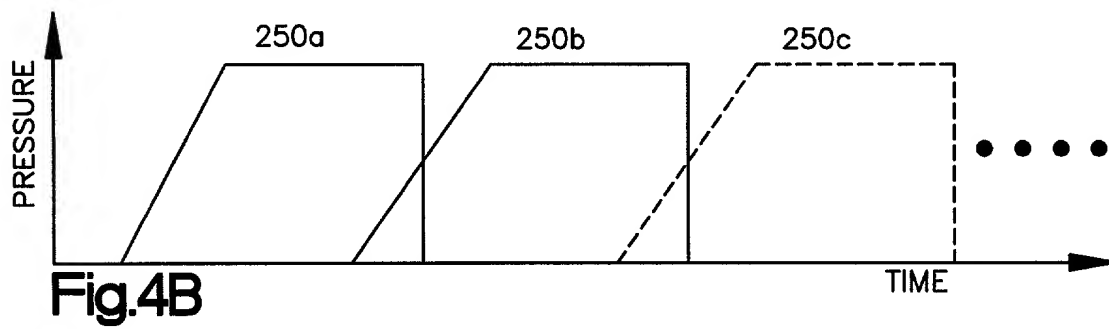
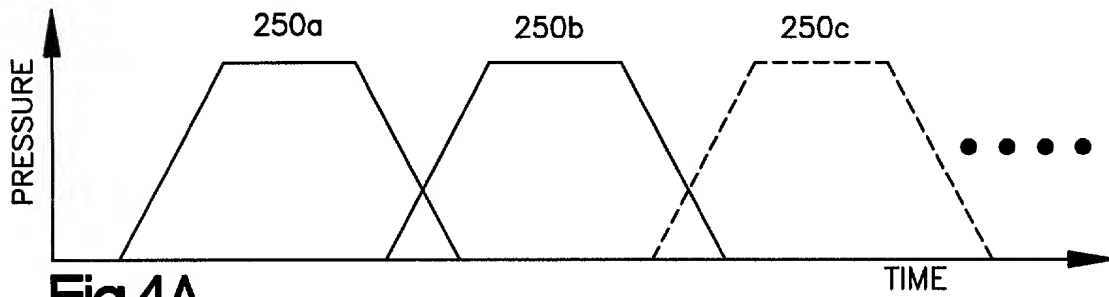
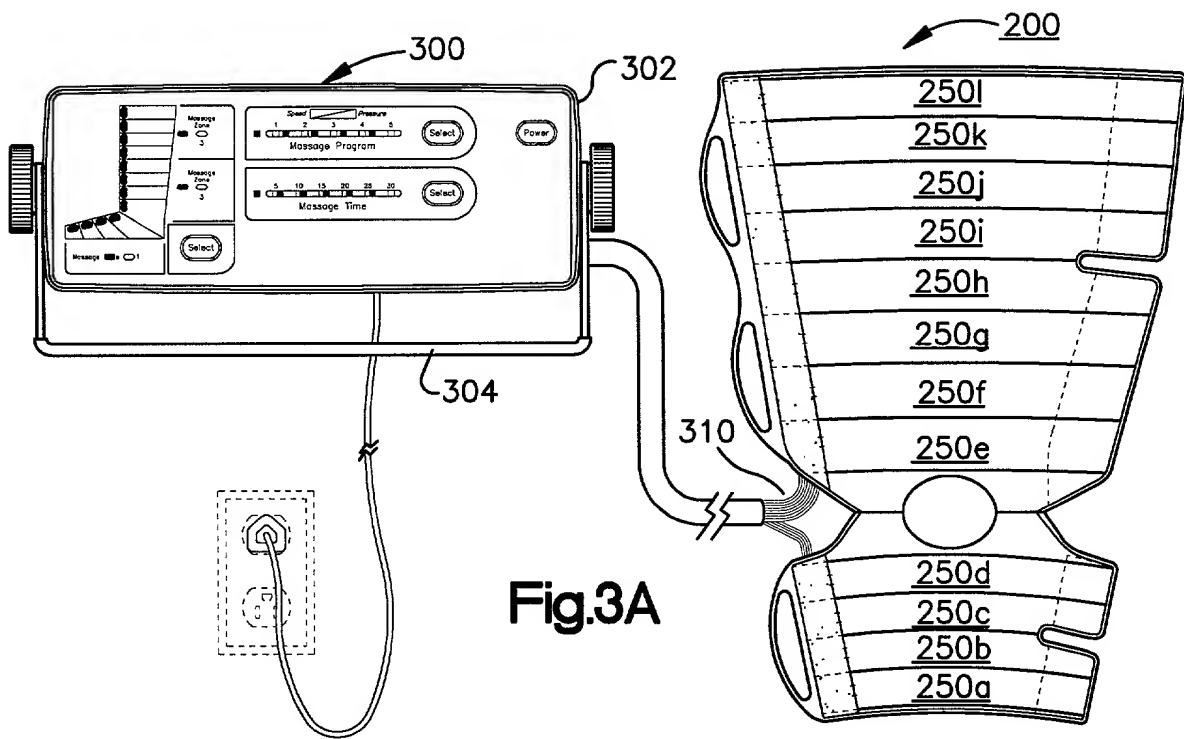
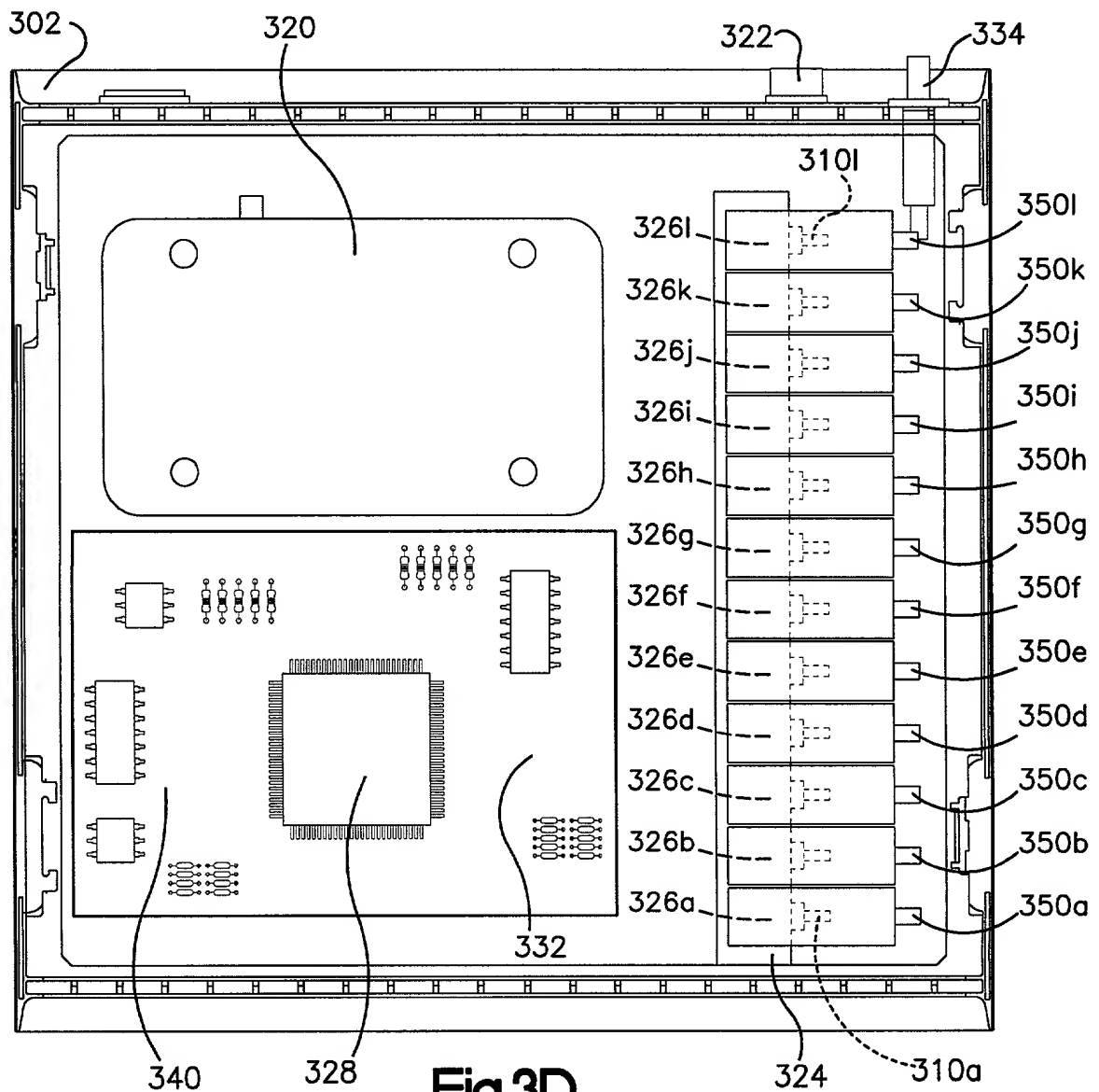
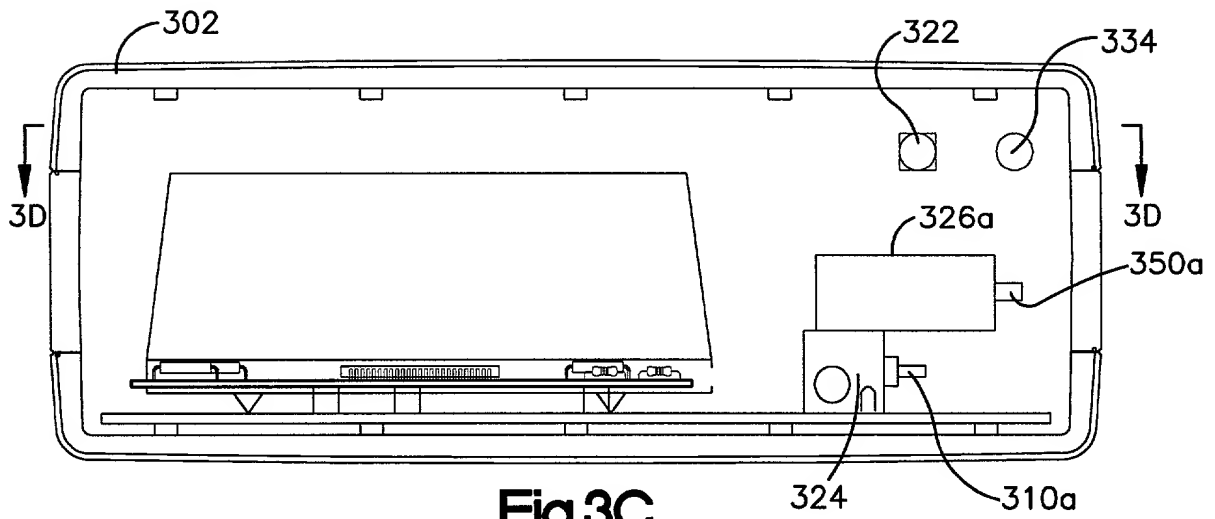


Fig.2B

[illegible]

Fig.2C





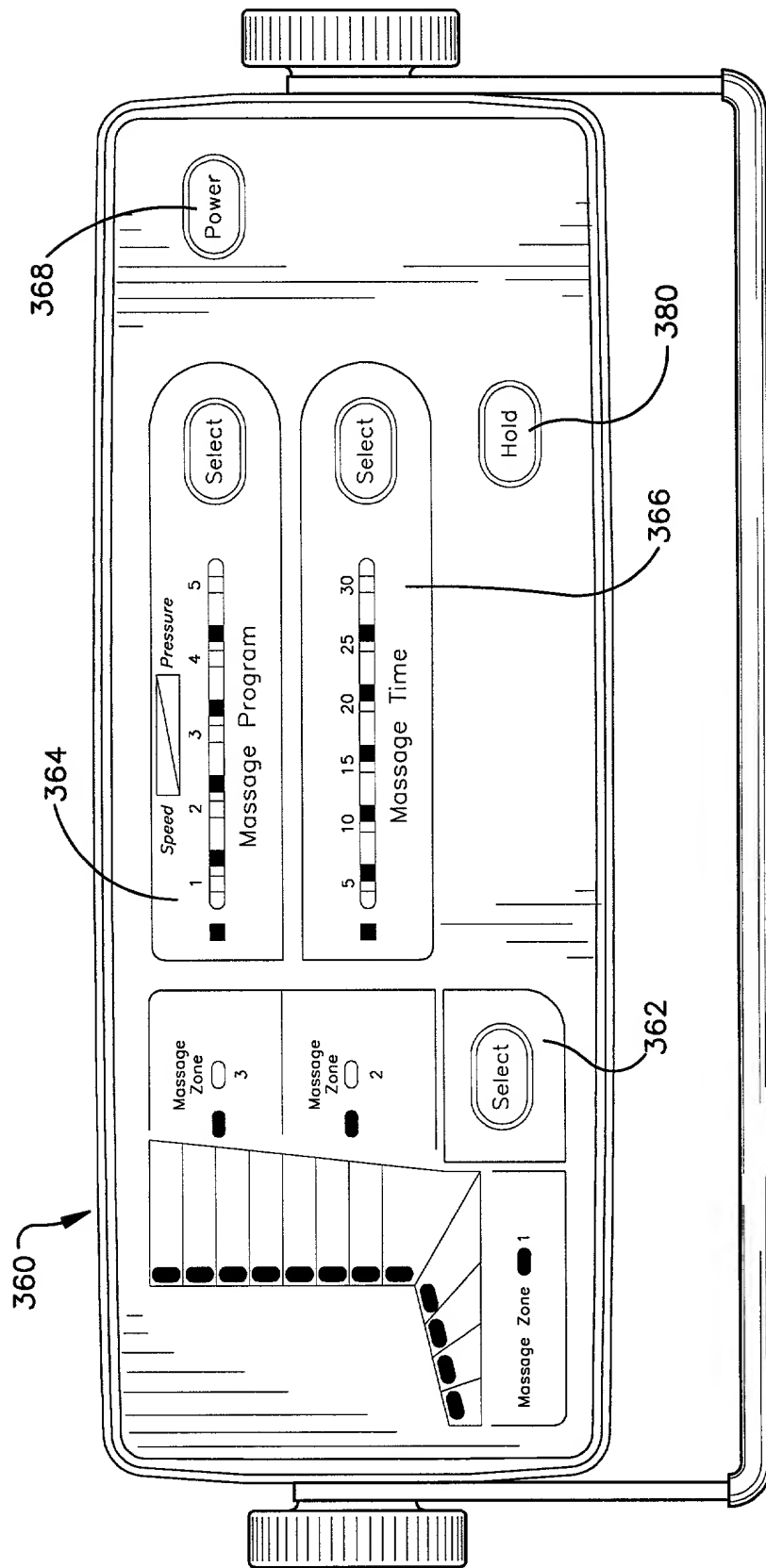


Fig.3E

Attorney Docket No. RRTHP0102US **PATENT (OUS)**

COMBINED DECLARATION AND POWER OF ATTORNEY
(ORIGINAL, DESIGN, NATIONAL STAGE OF PCT)

As a below named inventor, I hereby declare that my residence, post office address and citizenship are as stated below next to my name; and I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Title: **MESSAGE DEVICE**

the specification of which

☒ is attached hereto, or

☐ was filed as United States Application or PCT International Application (give Express Mail label number and deposit date if Application number not yet known):

Application No.:
(Express Mail Label No.)
Filing Date:
(Deposit Date)
Amended on (if applicable):

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations §1.56(a).

PRIORITY CLAIM

I hereby claim priority benefits under Title 35, United States Code, §119 of (i) any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed; and (ii) any United States provisional application(s) that is/are listed below.

- ☒ no such applications have been filed.
☐ such applications have been filed as follows.

**EARLIEST FOREIGN/PROVISIONAL APPLICATION(S), IF ANY FILED WITHIN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

COUNTRY	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED	
			Yes	No

**ALL FOREIGN APPLICATION(S), IF ANY FILED MORE THAN 12 MONTHS
(6 MONTHS FOR DESIGN) PRIOR TO THIS U.S. APPLICATION**

POWER OF ATTORNEY

As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (List name and registration number)

Neil A. Duchez; Reg. No. 26,725; Warren A. Sklar, Reg. No. 26,373; Cynthia S. Murphy 33,430

The undersigned to this declaration and power of attorney hereby authorizes the U.S. attorney(s) named herein to accept and follow instructions from

Authorized representative:

as to any actions to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney(s) and the undersigned. In the event of a change in the person(s) from whom instructions may be taken, the U.S. attorney(s) will be so notified by the undersigned.

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Direct Telephone Calls To:

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Cynthia S. Murphy
(216) 621-1113

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with knowledge that willful false statements and the like are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued therein.


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Post Office Address:	1525 Kew Road		

CHECK FOR ANY OF THE FOLLOWING ADDED PAGE(S) WHICH
FORM A PART OF THIS DECLARATION

- [X] Signature for additional joint inventors.
 [] Added page to combined declaration and power of attorney for divisional, continuation, or continuation-in-part (CIP) application.
 [] This declaration ends with this page.

**ADDED PAGE TO COMBINED DECLARATION AND POWER OF ATTORNEY
FOR SIGNATURE BY THIRD AND SUBSEQUENT INVENTORS**

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Inventor's signature:		Date:	5.30.00
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Full Name of Additional Joint Inventor (if any): Roger H. Ramsey			
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Inventor's signature:		Date:	
Residence: (City & State/Country):		Citizenship:	
Post Office Address:			

Full Name of Additional Joint Inventor (if any):			
Inventor's signature:		Date:	
Residence: (City & State/Country):		Citizenship:	
Post Office Address:			

Full Name of Additional Joint Inventor (if any):			
Inventor's signature:		Date:	
Residence: (City & State/Country):		Citizenship:	
Post Office Address:			

Parameter	1990-1991		1991-1992		1992-1993		1993-1994		1994-1995		1995-1996		1996-1997		1997-1998		1998-1999		1999-2000		2000-2001		2001-2002		2002-2003		2003-2004		2004-2005		2005-2006		2006-2007		2007-2008		2008-2009		2009-2010		2010-2011		2011-2012		2012-2013		2013-2014		2014-2015		2015-2016		2016-2017		2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		2022-2023		2023-2024		2024-2025		2025-2026		2026-2027		2027-2028		2028-2029		2029-2030		2030-2031		2031-2032		2032-2033		2033-2034		2034-2035		2035-2036		2036-2037		2037-2038		2038-2039		2039-2040		2040-2041		2041-2042		2042-2043		2043-2044		2044-2045		2045-2046		2046-2047		2047-2048		2048-2049		2049-2050		2050-2051		2051-2052		2052-2053		2053-2054		2054-2055		2055-2056		2056-2057		2057-2058		2058-2059		2059-2060		2060-2061		2061-2062		2062-2063		2063-2064		2064-2065		2065-2066		2066-2067		2067-2068		2068-2069		2069-2070		2070-2071		2071-2072		2072-2073		2073-2074		2074-2075		2075-2076		2076-2077		2077-2078		2078-2079		2079-2080		2080-2081		2081-2082		2082-2083		2083-2084		2084-2085		2085-2086		2086-2087		2087-2088		2088-2089		2089-2090		2090-2091		2091-2092		2092-2093		2093-2094		2094-2095		2095-2096		2096-2097		2097-2098		2098-2099		2099-2100		2100-2101		2101-2102		2102-2103		2103-2104		2104-2105		2105-2106		2106-2107		2107-2108		2108-2109		2109-2110		2110-2111		2111-2112		2112-2113		2113-2114		2114-2115		2115-2116		2116-2117		2117-2118		2118-2119		2119-2120		2120-2121		2121-2122		2122-2123		2123-2124		2124-2125		2125-2126		2126-2127		2127-2128		2128-2129		2129-2130		2130-2131		2131-2132		2132-2133		2133-2134		2134-2135		2135-2136		2136-2137		2137-2138		2138-2139		2139-2140		2140-2141		2141-2142		2142-2143		2143-2144		2144-2145		2145-2146		2146-2147		2147-2148		2148-2149		2149-2150		2150-2151		2151-2152		2152-2153		2153-2154		2154-2155		2155-2156		2156-2157		2157-2158		2158-2159		2159-2160		2160-2161		2161-2162		2162-2163		2163-2164		2164-2165		2165-2166		2166-2167		2167-2168		2168-2169		2169-2170		2170-2171		2171-2172		2172-2173		2173-2174		2174-2175		2175-2176		2176-2177		2177-2178		2178-2179		2179-2180		2180-2181		2181-2182		2182-2183		2183-2184		2184-2185		2185-2186		2186-2187		2187-2188		2188-2189		2189-2190		2190-2191		2191-2192		2192-2193		2193-2194		2194-2195		2195-2196		2196-2197		2197-2198		2198-2199		2199-2200		2200-2201		2201-2202		2202-2203		2203-2204		2204-2205		2205-2206		2206-2207		2207-2208		2208-2209		2209-2210		2210-2211		2211-2212		2212-2213		2213-2214		2214-2215		2215-2216		2	
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